UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,893	03/31/2004	Takashi Yamazaki	ASAM.0118	4985

7590 10/10/2006	**EXAMINER**	
REED SMITH LLP	BRADLEY, MATTHEW A	
Suite 1400		
3110 Fairview Park Drive	**ART UNIT**	**PAPER NUMBER**
Falls Church, VA 22042	2187	

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/812,893	YAMAZAKI ET AL.
	Examiner	Art Unit	
	Matthew Bradley	2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _31 March 2004_.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-20_ is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-20_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _31 March 2004_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☒ All   b) ☐ Some *   c) ☐ None of:

       1. ☒ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____.

       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-SB/08)
     Paper No(s)/Mail Date _3/31/04, 11/1a/04, 01/06/05, 07/11/05, 08/03/05_

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 11 July 2005 was filed after the mailing date for application 10/812,893. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

The information disclosure statement (IDS) submitted on 6 January 2005 was filed after the mailing date for application 10/812,893. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

The information disclosure statement (IDS) submitted on 1 November 2004 was filed after the mailing date for application 10/812,893. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

The information disclosure statement (IDS) submitted on 31 March 2004 was filed on the mailing date for application 10/812,893. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Status

Claims 1-20 remain pending and are ready for examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-20 are rejected under 35 U.S.C. 102(a) and 35 U.S.C. 102(e) as being anticipated by Ellis et al (U.S. 2003/0212859) hereinafter referred to as Ellis.

As per independent claim 1, Ellis teach,

- o a plurality of hard disk drives; and (Figure 3 items 311 as taught in Paragraph 0040)

- o a controller constructed by including a host interface which receives a request for a data read and request for a data write from/to said hard disk

drives from said information processing apparatus, (Figure 3 items 302 as taught in Paragraph 0040)

o a disk interface connected to said hard disk drives so as to be able to communicate therewith through a communication path which performs data input/output to/from said hard disk drives, (Figure 3 items 316 as taught in Paragraph 0040)

o a memory, (Paragraph 0046 'taught as RAM')

o a CPU which controls said host interface, said disk interface, and (Figure 3 item 306 as taught in Paragraph 0040)

o a time counting mechanism, (Paragraph 0052 'taught as state machine')

o wherein a logical volume is formed in a RAID group with redundancy made up of a plurality of said hard disk drives, said disk array apparatus comprising: (Paragraph 0066 'taught as a logical storage unit')

o an access time storage section which stores, upon reception of a request for a data read or request for a data write from/to said logical volume from said information processing apparatus, a time acquired from said time counting mechanism as an access time in said memory in association with an identifier of said RAID group in which said logical volume is formed; and (Paragraph 0064 and 0065)

o a power saving mode execution section which refers to said access time stored in said memory and sets a number of said hard disk drives according to the redundancy of said RAID group to a power saving mode

when the difference between a current time acquired from said time

counting mechanism and said access time exceeds a predetermined time

(Paragraph 0036).

As per dependent claim **2**, Ellis teach, a plurality of communication paths which

connect said disk interface and said plurality of hard disk drives, (Figure 3 as shown

with respect to the interconnections), wherein said hard disk drives are connected to

any one of said communication paths so as to be able to communicate therewith,

(Figure 3), a communication path selection section which selects said communication

path having the least number of said hard disk drives in a power saving mode is

provided, and said power saving mode execution section sets said hard disk drives

connected so as to be able to communicate with said communication path selected by

said communication path selection section to a power saving mode (Paragraph 0036).

As per dependent claims **3** and **15**, Ellis teach, a read request responding section

which responds, upon reception of said request for a read from said logical volume

formed by including said hard disk drives in said power saving mode from said

information processing apparatus, to said read request using the redundancy of said

RAID group from said hard disk drives not in a power saving mode out of said hard disk

drives making up said logical volume; and (Paragraph 0073 'taught as READ

operation'), a power saving mode cancellation section which cancels the power saving

mode of said hard disk drives in a power saving mode after said read request

responding section responds to said read request (Paragraph 0036 'taught as a host

command used to change the power mode').

As per dependent claims **4** and **16**, Ellis teach, a spare drive storage section

which stores duplicates of data stored in said hard disk drives in spare drives which are

reserved drives for said hard disk drives before said power saving mode execution

section sets said hard disk drives to a power saving mode; (Paragraph 0064 and 0065

The Examiner notes that the system of Ellis teach a RAID 1 configuration, thus

anticipating the instant limitation of duplicates), a write request responding section

which responds, upon reception of said request for a write to said logical volume formed

by including said hard disk drives in a power saving mode, to said write request by

regarding said hard disk drives not in a power saving mode out of said hard disk drives

making up said logical volume and said spare drives as said RAID group in which said

logical volume is formed; and (Paragraph 0036 as taught in Paragraph 0075 'taught as

a host command that is passed to the media controller to wake the disks'), a power

saving mode cancellation section which cancels the power saving mode of said hard

disk drives in a power saving mode after said write request responding section

responds to said write request and stores duplicates of data stored in said spare drives

in said hard disk drives whose power saving mode has been canceled (Paragraph 0036

'taught as a host command used to change the power mode')

As per dependent claims **5** and **17**, Ellis teach, a position information storage

section which stores position information of the data written in said spare drives by said

write request responding section according to said write request in said memory,

(Paragraph 0043 '*The Examiner notes that the system of Ellis is able to address each*

drive independently, thereby anticipating the instant limitation'.), wherein said power

saving mode cancellation section stores duplicates of said data stored in the positions

indicated by said position information of said spare drives in said hard disk drives whose

power saving mode has been canceled (Paragraph 0036 'taught as a host command

used to change the power mode').

As per dependent claims **6** and **18**, Ellis teach, a write request responding

section which writes, upon reception of said request for a write to said logical volume

formed by including said hard disk drives in a power saving mode, the data

accompanying said write request in only said hard disk drives not in a power saving

mode out of said hard disk drives making up said logical volume and responds to said

write request; and (Paragraph 0036 'taught as a host command used to change the

power mode', and Paragraph 0075 'as the media controllers are listening for the host

commands to wake the drives – which is then operable for the WRITE operation'; as

shown in claim 31), a power saving mode cancellation section which cancels the power

saving mode of said hard disk drives in a power saving mode after said write request

responding section responds to said write request (Paragraph 0036 'taught as a host

command used to change the power mode'), generates data to be stored in said hard

disk drives in a power saving mode using the redundancy of said RAID group from the

data stored in said hard disk drives not in a power saving mode out of said hard disk

drives making up said logical volume and stores said data generated in said hard disk

drives whose power saving mode has been canceled (Paragraph 0089).

As per dependent claims **7** and **19**, Ellis teach, a position information storage

section which stores position information in said hard disk drives of the data written in

said hard disk drives in a power saving mode in said memory for said write request,

(Paragraph 75 as shown in paragraph 0043 'taught as a addressing the storage media')

wherein said power saving mode cancellation section generates data to be stored at

positions indicated by said position information of said hard disk drives in a power

saving mode using the redundancy of said RAID group from the data stored in said hard

disk drives not in a power saving mode out of said hard disk drives making up said

logical volume and stores said generated data in said hard disk drives whose power

saving mode has been canceled (Paragraph 0089 'taught as transfer of data' with

respect to the citing above).

As per independent claim **8**, Ellis teach,

> *In addition to the limitations presented with respect to independent claim*
>
> *1, claim 8 adds the following limitations:*

- o   a power saving start time storage section which stores the second time

   acquired from said time counting mechanism as a power saving start time

   in said memory (Paragraph 0036 taught as the timer that expires after the

   last host access) in association with an identifier of said RAID group when

   said first or second hard disk drives are set to a power saving mode by

   said power saving mode execution section; and (Paragraph 0036 with

   respect to claim 29)

- o   a power saving mode cancellation section which refers to said power

   saving start time and cancels the power saving mode of said first or

   second hard disk drives in a power saving mode when the difference

between said power saving start time and a third time acquired from said

time counting mechanism exceeds a predetermined time (Paragraph 0036

'taught as a host command used to change the power mode').

As per dependent claim **9**, Ellis teach, wherein the usage mode of each said

RAID group is stored in said memory, and when said RAID group consists of said first

hard disk drives and said second hard disk drives, said power saving mode execution

section sets a number according to the redundancy of said RAID group or an arbitrary

number of said first or second hard disk drives to a power saving mode according to

said usage mode of said RAID group (Paragraph 0041).

As per dependent claim **10**, Elllis teach, a continuous operation time storage

section which stores a continuous operation time for each said RAID group in said

memory; and a batch spare execution section which stores duplicates of data stored in

all said first or second hard disk drives making up said RAID group whose said

continuous operation time exceeds a predetermined time in spare drives which are

reserved parts of said first or second hard disk drives and sets all said first or second

hard disk drives making up said RAID group to a power saving mode (Paragraph 0041

and paragraph 0043).

As per dependent claim **11**, Ellis teach, an accumulated operation time storage

section which stores an accumulated operation time for each of said first or second hard

disk drives in said memory, wherein said power saving mode execution section sets

said first or second hard disk drives whose said accumulated operation time is long out

of said first or second hard disk drives making up said RAID group to a power saving

mode (Paragraph 0036 'taught as a timer that expires from last host access for entering a mode of reduced power consumption').

As per dependent claim **12**, Ellis teach, wherein after canceling the power saving mode of said first or second hard disk drives whose power saving mode cancellation section is set to a power saving mode, said power saving mode execution section sets said first or second hard disk drives whose said operation time is long out of said first or second hard disk drives of the RAID group including said first or second hard disk drives to a power saving mode (Paragraph 0064 and 0065).

As per dependent claim **13**, Ellis teach, a load time storage section which stores the time at which the head of each of said first or second hard disk drives is loaded as the load time in said memory; and an unload execution section which unloads the heads of said hard disk drives whose difference between said load time and the time acquired from said time counting mechanism exceeds a predetermined time (Paragraph 0044).

As per dependent claim **14**, Ellis teach, an accumulated operation time storage section which stores the accumulated operation time of each of said first or second hard disk drives in said memory; (Paragraph 0036 'taught as a the timer') an error count storage section which stores a count of errors produced at each of said first or second hard disk drives in said memory; (Paragraph 0039 'taught as an error report') and a dynamic spare execution section which stores duplicates of data stored in said first or second hard disk drives whose said error count exceeds a predetermined error count

according to said accumulated operation time in spare drives which are reserved parts of said first or second hard disk drives (Paragraph 0044).

As per independent claim **20**, Ellis teach,

- o a step of storing, upon reception of a request for a data read or request for a data write from/to said logical volume from said information processing apparatus, a first time acquired from said time counting mechanism as an access time in said memory in association with an identifier of said RAID group in which said logical volume is formed; (Paragraph 0052)

- o a step of referring to said access time stored in said memory and checking whether the difference between a second time acquired from said time counting mechanism and said access time exceeds a predetermined time or not; (Paragraph 0052 'taught as referring to state machines')

- o a step of setting a number of said first hard disk drives according to the redundancy of said RAID group to a power saving mode when said RAID group whose difference between the second time acquired from said time counting mechanism and said access time exceeds a predetermined time consists of only said first hard disk drives; (Paragraph 0036)

- o a step of setting an arbitrary number of said second hard disk drives to a power saving mode when said RAID group whose difference between the time acquired from said time counting mechanism and said access time exceeds a predetermined time consists of only said second hard disk drives; (Paragraph 0036)

   o   a step of storing, when said first or second hard disk drives are set to a

       power saving mode, a third time acquired from said time counting

       mechanism as a power saving start time in said memory in association

       with an identifier of said RAID group; and (Paragraph 0043)

   o   a step of referring to said power saving start time and canceling the power

       saving mode of said first or second hard disk drives in a power saving

       mode when the difference between said power saving start time and the

       time acquired from said time counting mechanism exceeds a

       predetermined time (Paragraph 0036 as taught in Paragraph 0075 'taught

       as a host command that is passed to the media controller to wake the

       disks').

Conclusion

The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

1. U.S. 2004/0243761 Bohrer et al teach a power consumption reduction method

for RAID based storage systems (see Paragraph 0003)

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Matthew Bradley whose telephone number is (571) 272-

8575. The examiner can normally be reached on 6:30-3:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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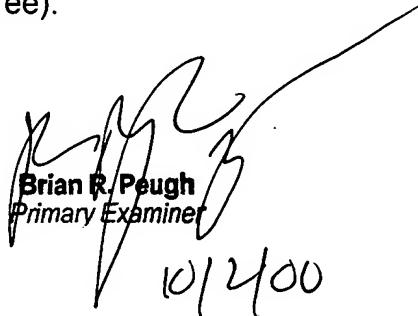
Brian R. Peugh
Primary Examiner

10/24/00